

**The Role of Forward Rates in Pricing Interest Rate Derivatives**

By  
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Although forward interest rates reflect an expectation of rising short term rates for the foreseeable future, that doesn't mean that you should believe these forecasts.

The following chart highlights this consideration. It shows a history of spot 3 month LIBOR and associated futures rates for each of the quarterly 3-month Eurodollar futures contracts that (have or will) expire in 2011. For Eurodollar futures, futures *rates* equal 100 minus futures *prices*. By design, when these contracts expire, the final settlement price is set to be 100 minus the British Bankers Association (BBA) quotation for 3 month LIBOR.

Reading from the bottom up, the lowest line in the rate for spot LIBOR; the next line up is the March '11 futures rate, then June '11, September '11, and December '11. Data continue through mid March 2011. As of this writing, the March '11 contract has expired; and you'll note that, at expiration, this futures rate converged to the spot LIBOR.

Eurodollar futures are priced in such a way as to reflect the forecasts embedded in the LIBOR-based yield curve. Throughout the term shown, this yield curve was upward sloping, and as a consequence, throughout this period, futures rates were higher and higher for successive expirations. Future prices (rates) also reflect consensus forecasts as to where the spot market will trade when the futures expire.

If you focus on the left margin of the chart, the data suggest that as of mid-March 2010, when spot LIBOR was about 0.26%, the consensus forecast called for LIBOR to rise to 1.18% by mid-March 2011, 1.55% by mid-June, 1.93% by mid-September, and 2.26% by mid-December (all of 2011). In fact, LIBOR seems to be pursuing a markedly different course.

In the next three months LIBOR did rise – but never reaching higher than 54 basis points. In mid-July, LIBOR started to retrace this rise, falling back down to about 0.30% by mid-September, and holding steady at this level since then.

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Meanwhile, consensus expectations get revised on an ongoing basis. The world continues to expect higher interest rates, but the anticipated increases are much more constrained than they were a year ago. When the March '11 contract expired, LIBOR had settled at just about the same level it had been a year earlier. The June, September, and December 2011 contracts predicted LIBORs of 0.36%, 0.44%, and 0.57% respectively.

From a hedging perspective, it's not quite clear how these consensus forecasts should be viewed. If we believe them, we're no better hedging than we are not hedging. That is if the implied forecasts are realized, the effective interest rate that we'd realize with a fully hedged position would be the same as that which would be realized with an unhedged position – although the timing of the income recognition would differ. For example, if we had hedged with a swap, we would have locked in a term rate and presumably (with hedge accounting) recorded an fixed interest amount in earnings each period. Without hedging but if forward interest rates present at the time the hedge was being considered were ultimately realized, we'd ultimately pay the same effective interest, but we'd record graduated amounts consistent with the successively higher sequential forward (futures) rates.

Essentially, for hedging to make sense, hedgers would have to believe that prevailing forward pricing won't hold. Put another way, locking in fixed costs only make sense if we expect forward interest rates to rise above their current levels; or conversely, locking in fixed returns makes sense only if we expected forward interest rates to move lower. Put another way, forward prices are built into swap fixed rates. When expectations are *correctly* built into swap pricing, swaps serve only to shift the timing of earnings recognition. The aggregate gain or loss on the derivative, however, should be understood to be effectively zero. The true benefit of swaps arises when the forward expectations are confounded.

Sometime, we just have to bite the bullet and take what the market gives us. The real lesson, though, is that we should evaluate our risks on an ongoing basis and seek to hedge them *before* those risks are widely perceived to have high probability of coming to fruition.

As the world becomes more convinced that higher interest rates are more imminent – the yield curve will steepen and successive forward interest rates will reflect larger differences from the current spot rates. If we're exposed to rising interest rates, it would be nice to transact our derivative positions before those expectations get priced in. Those with the luxury of the opposite exposure – exposure to declining rates – should count themselves lucky. For this class of hedgers, forward pricing effectively offers the prospect of earning higher returns on assets as a byproduct of extending out on the yield curve. Nice work if you can get it!